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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/873,567	06/04/2001	Joseph P. Meehan	US 010229	4213

24737 7590 02/23/2006

PHILIPS INTELLECTUAL PROPERTY & STANDARDS  
P.O. BOX 3001  
BRIARCLIFF MANOR, NY 10510

EXAMINER
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TRAN, KHANH C

ART UNIT	PAPER NUMBER
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2631

DATE MAILED: 02/23/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 09/873,567	<b>Applicant(s)</b> MEEHAN ET AL.	
	<b>Examiner</b> Khanh Tran	<b>Art Unit</b> 2631	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 21 November 2005.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 4-11, 13-15, 17 and 19 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 4-11, 13-15, 17 and 19 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 04 June 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### **DETAILED ACTION**

1. The Amendment filed on 11/21/2005 has been entered. Claims 4-11, 13-15, 17 and 19 are pending in this Office action.

### ***Response to Arguments***

2. Applicant's arguments with respect to claims 4-6, 11 and 15 have been considered but are moot in view of the new ground(s) of rejection. See the explanation in the claim rejection below.

### ***Drawings***

3. Figure 1 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

***Claim Objections***

4. Claim 7 is objected to because of the following informalities: in line 3, "each" should be changed to -- , each --; in line 4, "outputs" should be changed to -- outputting --; in line 7, "N forward equalizers generating" should be changed to -- N forward equalizers generating, each generating --. Appropriate correction is required.

5. Claim 17 is objected to because of the following informalities: in line 7, "signal" should be changed to -- signals --. Appropriate correction is required.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 6-7 and 17 are rejected under 35 U.S.C. 102(b) as being anticipated by Cupo et al. U.S. Patent 5,353,312.

Regarding claim 7, figure 1 discloses a receiver including:

A/D converters 103 and 104 for receiving two bit streams at first sampling rate and outputting bit streams at second sampling rate; see column 3 lines 15-35;

Adaptive equalizers 106 and 107 for generating equalized feedback signals via leads 124 and 125; see column 4 lines 10-30;

A timing recovery circuit 123 for generating a timing recovery control signal based upon the equalized feedback signals via leads 124 and 125; see column 4 lines 10-30.

Further in column 2 lines 20-35, the digital data to be transmitted is divided into two different digital signals and each signal is coupled through an associated transmission channel. At the receiver, the received version (channels A and C, see figure 1) of each transmitted signal is processed by an associated equalizer and the outputs therefrom are combined to recover the digital data. In light of the foregoing discussion, the receiver includes two antennas for receiving the two transmitted digital signals.

Regarding claim 6, claim 6 is rejected on the same ground as for claim 7 because of similar scope.

Regarding claim 17, claim 17 is rejected on the same ground as for claim 7 because of similar scope. Furthermore, in column 11 lines 15-45, Cupo et al. teaches Refer now to FIG. 3 which shows the sequence of operations performed by timing recovery circuit 123 in an embodiment. At step 304, the weighted average of the delay and amplitude responses of equalizer A,  $W_A(\omega)$  is determined. The corresponding weighted average  $W_C(\omega)$  is determined at step 306. These two weighted averages are

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then combined at step 308 to form  $W(m)$ . This quantity, which is the arithmetic average of the two weighted averages  $W_A(\omega)$  and  $W_C(\omega)$ , is then utilized in steps 311 through 331 to provide appropriate sampling clock signals from receiving timing generator 105 to A/D converters 103 and 104.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 8 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cupo et al. U.S. Patent 5,353,312 in view of figure 1 admitted prior art.

Regarding claim 8, Cupo et al. does not teach N carrier recovery circuits as set forth in the application claim.

On page 4 of the original disclosure, figure 1 admitted prior art discloses a receiver, as illustrated in FIG. 1, comprising a Timing Recovery (TR) circuitry employed in conventional chipsets. In FIG. 1, a digital television (DTV) receiver 1 includes a sample rate converter (SRC) 10, a carrier recovery (CR) circuit 12, a square-root raised cosine (SQRC) filter 14 (e.g., a finite impulse response (FIR) filters with a square root of a raised cosine characteristic and a forward equalizer (FE) 16.

In column 4 lines 10-30, Cupo et al. teaches that the clock signal for A/D converters 103 and 104 is provided by receiver timing generator 105 in response to a master clock signal furnished by master clock 122 and to timing adjustment signals provided by timing recovery circuit 123 as shown in figure 1. To compensate for timing offset and drift, the frequency and/or phase of this master clock signal is altered by receiver timing generator 105 using timing adjustment signals provided by the timing recovery circuit 123. In light of the foregoing discussion, Cupo et al. teachings employ coherent detection to compensate for timing offset and drift. Because carrier offset must be estimated at the receiver if the detector is phase-coherent, therefore, it would have been obvious for one of ordinary skill in the art at the time the invention was made that Cupo et al. teachings can be modified to implement a carrier recovery (CR) circuit for each receiving path as taught in figure 1 admitted prior art. The implemented CR circuit for each receiving path is coupled between the A/D converter and the equalizer as disclosed in figure 1.

Regarding claim 19, claim 19 is rejected on the same ground as for claim 8 because of similar scope.

8. Claims 11 and 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Langberg U.S. Patent 5,703,905.

Regarding claim 11, Langberg et al. invention is directed to a timing recovery system for use in a multi-channel receiver. Figure 1 shows a portion of a transmitter-receiver (transceiver) system including channel A and channel B.

In column 4, lines 1-16, the receiver include A/D converter 103a (for channel A) and A/D converter 103b (for channel B), which correspond to the claimed sample rate converters, each receiving an symbol stream at a first sampling rate and converting it to a symbol stream at a second sampling rate.

The receiver further comprises adaptive equalizers 10a and 10b, each includes a feed forward equalizer; see column 5, line 14 via column 6, line 50; see also figure 2.

Langberg et al. does not expressly teach the equalizers 10a and 10b generating equalized feedback signals as claimed in the application claim.

Nevertheless, in column 10, lines 5-11, the timing signals input to timing recovery circuit 107 in the invention were derived from band-edge filters coupled to each channel receiver input. However, Langberg et al. further suggests data derived frequency and phase signals usable to control the timing recovery circuit may be derived from other circuits, e.g., adaptive equalizers. In light of the foregoing suggestion, it would have been obvious for one of ordinary skill in the art at the time the invention was made that Langberg et al. receiver can be modified to implement adaptive equalizers for providing the timing signals to the timing recovery circuit 107, shown in figure 1. In light of the aforementioned



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discussion, each output of the adaptive equalizers is fed back to the SNR sensor timing recovery block 150 (see figure 4)

With the modification discussed above, the band-edge filters coupled to each channel correspond to the claimed carrier recovery circuits for electrically coupled the A/Ds 103a and 103b to the adaptive equalizers.

Regarding claim 15, the receiver in figure 1 further shows a channel select 155 and a SNR sensor timing recovery selection block 150, which receives timing signals TSa and TSb based on the adaptive equalizers. The channel select 155 applies the selected one of the timing signals TSa and TSb to the timing recovery circuit 107.

8. Claims 4-5, 9-10 and 13-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Langberg U.S. Patent 5,703,905 as applied to claim 11 above, and further in view of admitted prior art and Bernard Sklar, "Digital Communications Fundamentals and Applications".

Regarding claims 4-5, 9-10 and 13-14, Langberg does not teach the carrier bandpass filter being a square-root raised cosine filter as claimed in the application claim.

Figure 1 admitted prior art teaches a receiver including square-root raised cosine (SQRC) filter 14. Bernard Sklar discloses in the textbook "Digital Communications Fundamentals and Applications" on pages 100-103 that a square-root raised cosine

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filtering is frequently used in digital communications because of the excellent characteristic of square-root raised cosine function for pulse shaping to reduce intersymbol interference. In light of the foregoing reason, it would have been obvious for one of ordinary skill in the art at the time the invention was made that Langberg teachings can be modified to implement the square-root raised cosine filter. The square-root raised cosine filter is a finite impulse response filter.

### ***Conclusion***

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Rouvellou U.S. Patent 6,831,958 B1 discloses "Timing Recovery Device Using Fixed Equalizer".

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Khanh Tran whose telephone number is 571-272-3007. The examiner can normally be reached on Monday - Friday from 08:00 AM - 05:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammad Ghayour can be reached on 571-272-3021. The fax phone

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number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

KCT

*Khanh Cong Tran*

02/17/2006

Examiner KHANH TRAN